taining (1) the ether carboxylate compositions herein or (2) the novel components of such compositions.

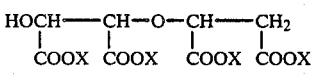
In its process aspects, the present invention relates to a process for preparing a mixture of ether carboxylates useful as detergent builder composition. Such process involves the formation of an aqueous reaction mixture containing, as reactants, from about 20% to 60% by weight of both calcium and monovalent cation salts of maleic acid and tartaric acid. Such a reaction mixture corresponds to the over-neutralized mixture which is formed by combining maleic and tartaric acids in a molar ratio of from about 0.5:1 to about 8:1, along with particular amounts of a source of calcium cations and a neutralizing agent comprising an hydroxide of a monovalent cation. The source of calcium cations, preferably calcium hydroxide, is added to the reaction mixture in a molar ratio of calcium to tartaric acid within the range of from about 0.1:1 to 2:1 with the proviso that the moles of calcium added not exceed the total moles of maleic and tartaric acids added. The monovalent cation-containing neutralizing agent is added in an amount such that the ratio of monovalent cations to moles of maleic acid plus moles of tartaric acid minus moles of calcium ranges from about 2.1:1 to about 3.8:1. Such a reaction mixture is maintained at a temperature of from about 20° C. to 120° C. for a period of time sufficient to form a reaction product mixture containing both (a) tartrate monosuccinic acid salt, and (b) tartrate disuccinic acid salt. The resulting reaction product mixture is thereafter treated to reduce its calcium content to the extent that the molar ratio of calcium to the tartrate succinate product compounds therein is less than about 1:10.

BRIEF DESCRIPTION OF THE DRAWING

The drawing provides an illustration of the concentration of free calcium ion in a solution into which solutions of various builder materials, including those of the present invention, are titrated.

DETAILED DESCRIPTION OF THE INVENTION

The principal component of the ether carboxylate builder compositions of the present invention is a particular novel tartrate monosuccinic acid, or salts thereof, having the structural formula:

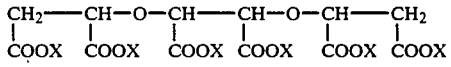


wherein X is H or a salt-forming cation. This tartrate monosuccinic acid or salt thereof is hereinafter designated as "TMS." "TMS" is used to designate both the acid and salt forms of this material.

The tartrate monosuccinic acid component may be employed in the compositions herein in its free acid form, i.e., wherein X in the structural formula is H. Alternatively, and preferably, this material may be partially or fully neutralized to a tartrate monosuccinate salt. Preferred salt-forming cations useful in forming the neutralized materials are those which yield substantially water-soluble salts of tartrate monosuccinic acid. Examples of such preferred salt-forming cations include alkali metal (e.g., sodium, potassium, lithium), ammonium, C_1-C_4 alkyl substituted ammonium and C_1-C_4 alkanolamine. The most preferred salt-forming cations are sodium, potassium, monoethanolamine and triethanolamine.

The tartrate monosuccinic component will generally be present in the builder compositions of this invention in an amount ranging from about 1% to 99% by weight of the composition. More preferably, the tartrate monosuccinate component will comprise from about 10% to 98% by weight of the builder compositions herein. Most preferably, this component is present to the extent of from about 20% to 97% by weight of the builder composition.

The second essential component of the ether carboxylate builder compositions of this invention is the particular novel polycarboxylate, tartrate disuccinic acid, or a salt thereof, having the structural formula:



wherein X is H or a salt-forming cation. Tartrate disuccinic acid, or a salt thereof, is hereinafter designated as "TDS."

As with the TMS component, the TDS component can be utilized in either its free acid form or in its partially or fully neutralized form in the builder compositions herein. Neutralizing cations are likewise those which provide TDS in the form of its substantially water-soluble salt. Examples of suitable salt-forming cations include the same cations hereinbefore described for formation of the tartrate monosuccinate material. For convenience both the acid and salt forms of the TDS material will hereinafter be referred to as the "tartrate disuccinate" or "TDS" component.

The TDS component will generally be present in the builder compositions of this invention in an amount ranging from about 1% to 99% by weight of the composition. More preferably, the TDS component will comprise from about 2% to 90% by weight of the builder compositions herein. Most preferably, TDS is present to the extent of from about 3% to 80% by weight.

The builder compositions of the present invention need only contain the tartrate monosuccinate and tartrate disuccinate components hereinbefore described and can be prepared in the form of solid or granular compositions containing these components. Frequently however, the builder compositions herein will contain optional materials such as those used or formed during the preparation of the builder compositions as hereinafter described. Most frequently, one such optional ingredient of the builder compositions herein will be water or moisture from the aqueous reaction mixture used to prepare the builder compositions. Other possible optional ingredients include unreacted reactants such as maleates, tartrates and alkaline earth metals, e.g., calcium, (in ionic, complex, or salt form) used in the preparation of the TMS and TDS components. Likewise, the builder compositions will frequently contain some by-products of the process used for composition preparation. Such by-products can include, for example, malates, maleates, tartrates, fumarates and the like.

No matter what the nature of the optional components, the builder compositions herein will generally contain no more than about 70% by weight of the composition of such optional components. Since the compositions herein are to be used as detergent builders, it is especially important that such compositions contain